SELF-ALIGNED NEAR SURFACE STRAP FOR HIGH DENSITY TRENCH DRAMS

ABSTRACT

A method and structure for a dynamic random access memory device comprising a storage trench, a storage conductor within the storage trench, a lip strap connected to the storage conductor, and a control device electrically connected to the storage conductor through the lip strap. The trench contains a corner adjacent the control device and the lip strap and has a conductor surrounding the corner. The control device has a control device conductive region adjacent the trench and the lip strap and has a conductor extending along a side of the trench and along a portion of the control device conductive region. In addition, the device can have a collar insulator along a top portion of the trench, wherein the lip strap includes a conductor extending from a top of the collar to a top of the trench. The lip strap can also extend along a surface of the device adjacent the trench and perpendicular to the trench. A node dielectric, lining the trench where the lip strap surrounds an upper portion of the node dielectric, is adjacent the top portion of the trench and can have a trench top oxide where the lip strap extends into the trench top oxide and forms an inverted U-shaped structure. Further, the lip strap can include a conductor extending along two perpendicular portions of a top corner of the trench.